INDIANA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS MANAGEMENT

LABORATORY TESTING OF CHEMICAL ANCHOR SYSTEMS
ITM No. 807-08T

1.0 SCOPE.

1.1 This test method covers the procedure for the laboratory testing of chemical anchor systems by installing grade 400 (60), #22 (#7) epoxy coated deformed steel reinforcing bar and applying a tensile load equal to the yield of the reinforcing bar.

1.2 The values stated in either English or acceptable SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other, without combining values in any way.

1.3 This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 TERMINOLOGY.

Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101, and the following:

2.1 Chemical anchor system. A high strength adhesive material used to chemically anchor steel reinforcing bar into concrete

2.2 Proof load. The yield of a grade 60 (400), #7 (#22) epoxy coated deformed steel reinforcing bar

3.0 SIGNIFICANCE AND USE.

This ITM is often used to confirm the minimum tensile load required for chemically anchored steel reinforcing bars.

4.0 APPARATUS.

4.1 Rotary Impact Hammer Drill

4.2 Spacer**,** 10 in. (254 mm) thick metal plate used to raise the height of the hydraulic ram

4.3 Hydraulic Ram

4.4 Interface 45.5 Mg (100 kips.) Load Cell Device

4.5 Air compressor or vacuum source of sufficient force to clean the concrete dust from drilled holes

4.6 Plastic Bottle Washer

4.7 Two, grade 60 (400), #7 (#22) epoxy coated deformed steel reinforcing bars, 36 in. (914 mm) in length. The top 3 in. (76 mm) are machine threaded to nine threads per inch (3.5 threads per 10 mm).

4.8 High strength nut, minimum Rockwell hardness of 25, 7/8 in (22 mm), threaded to nine threads per inch (3.5 threads per 10 mm).

5.0 PREPARATION OF TEST SPECIMEN.

5.1 A concrete block approximately 2.5 ft (0.8 m) in height, 3 ft (0.9 m) in length, and 4 ft (1.2 m) in width, shall be used to anchor a size #7 (#22) reinforcing bar. The block shall be at least 28 days old with a minimum compressive strength of 4000 psi (27.5 MPa).

5.2 Drill two holes using a rotary impact hammer drill in the concrete block. The holes are typically 1 in. (25 mm) in diameter and 9 in (230 mm) in depth. The minimum spacing between bars shall be equal to the embedment depth. The minimum distance from the edge of the concrete block will be 75% of the embedment depth.

5.3 Remove the concrete dust with the high pressure air hose or a vacuum. Dislodge the debris from the sides of each hole with the plastic bottle washer. Polish the sides of the hole and reduce the contact area with a metal bristled bottle washer. Use the high pressure air hose or vacuum to remove remaining concrete dust. The hole is required to be completely clean to facilitate installation of the chemical anchor system.

6.0 PROCEDURE.

6.1 Chemically anchor two, grade 400 (60), #22 (#7) epoxy coated deformed steel reinforcing bars in accordance with the manufacturer's instructions

6.2 Allow the chemically anchored steel reinforcing bars to cure for 7 days at room temperature

6.3 Place the 10 in. (254 mm) spacer over the steel reinforcing bar level with the concrete surface. Shims may be used to level the plate

6.4 Place the hydraulic ram over the steel reinforcing bar onto the top of the 10 in. (254 mm) spacer

6.5 Place the load cell device over the steel reinforcing bar onto the top of the hydraulic ram. This action should display only the top treaded portion of the steel reinforcing bar. Additional spacers may be used, if necessary.

6.6 Place a washer over the steel reinforcing bar positioned between the load cell device and the high strength 7/8 in. (22 mm) nut

6.7 Attach the high strength 7/8 in. (22 mm) nut to the exposed threaded portion of the steel reinforcing bar

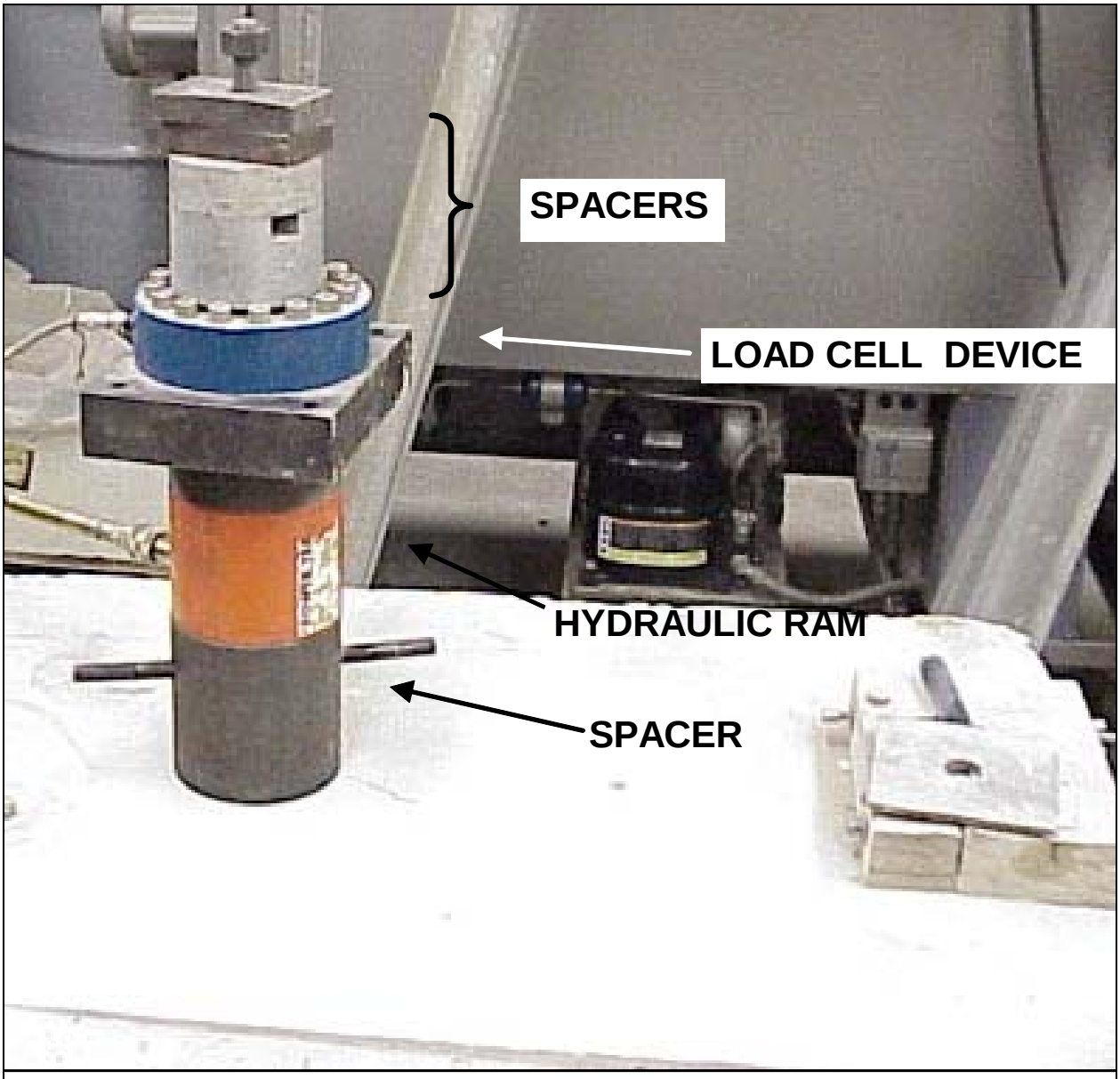
6.8 Apply a tensile load at 7200 lbm/min (32 kN/min) until the load reaches 36 kips (160.2 kN), the yield of the #7 (#22) bar

6.9 Release the load and remove the high strength nut, the washers, the load cell device, the hydraulic ram, and the spacer

6.10 Repeat 6.3 through 6.9 for the second steel reinforcing bar

7.0 REPORT.

7.1 The proof load or the maximum load achieved if less than the proof load is reported.


SPACERS
LOAD CELL DEVICE
HYDRAULIC RAM
SPACER